AMENDMENTS TO THE SPECIFICATION:

Please replace paragraph [0052] with the following amended paragraph:

[0052] A block diagram of a combined marker and line locator 400 according to some embodiments of the present invention is shown in FIG. 4. Locator 400 includes a line locator section 424 and a marker locator section 423. In the embodiment shown in FIG. 4, the top two data paths that originate from the reference antenna 401 and top antenna 402 are associated with a simple peak-mode line locator 424. The signal detected by reference antenna 401 can be processed through an amplifier 441 and a filter 442 before being digitized by analog-to-digital converter (ADC) 443. Similarly, the signal detected by antenna 402 can be processed through amplifier 444 and filter 445 before being digitized by ADC 446. The digital signals from ADC 443 and ADC 446 are input to a processor 420. The signal from ADC 443 is received by channel processor 447 and the signal from ADC ~~445~~ 446 is received by channel processor 448. Channel processors 447 and 448 determine signal strengths and signal directions, which can be displayed on locator display 450 through interface 449. In some embodiments, processor 420 may include a microprocessor or microcontroller executing software for performing the functions of processor channels 447 and 448. Measurements of signal strength from antennas 401 and 402, which are typically separated vertically by a known amount, allow calculation in processor 420 of conductor depth and the current through the conductor. In accordance with the present invention, any line locator structure may be included in line locator 424. For example, a line locator with left/right indication is disclosed in U.S. Pat. No. 6,407,550, issued on Jun. 18, 2002 to Parakulam et al. and assigned to the same assignee as is the present disclosure, which is herein incorporated by reference in its entirety.

Please replace paragraph [0078] with the following amended paragraph:

[0078] Marker search block 431 receives the time average signal from time average block ~~431~~ 430 as decay signal 700. Decay signal 700 is received in fast-Fourier transform 702 that performs a linear Fourier transform function on decay signal 700. The results of the Fourier transform are input to a determine active marker block 707 and may be output as part of marker structure signal 708. Initially, the marker frequency, phase, and amplitude can be derived from a thresholding operation on the output signal from linear FFT 702 of the time averaged signal 700. A good indicator of the presence of one or more marker types results from the extraction of peaks from the spectrum that are close to the nominal marker center frequencies. Amplitude and phase information are taken from the FFT result and written to the marker structure 706. The calibrated phase offset at that frequency is also carried along in marker structure 706.

Please replace paragraph [0083] with the following amended paragraph:

[0083] The actual frequency adaptation occurs in the NCO 1002, which results in a new current frequency 1011 for use in the transmitter output generation later. **FIG. 11** shows the structure of NCO 1002, which only runs if error signal 1009 is not close to zero, as determined by test 1104. Before the lock condition, the NCO ramps the frequency according to the loop update equation:

$$f(k+1) = f(k) + \alpha e(k) \qquad \text{(Equation 2)},$$

where f(k) and e(k) represent the frequency and phase error of the current decay block. Equation 2 is implemented by ~~multipler~~ multiplier 1105, summer ~~1008~~ 1108, and feedback 1107. The parameter α is the feedback coefficient and is selected in accordance with the pulse repetition rate and, for many systems, is about 0.00015.

AMENDMENTS TO THE ABSTRACT:

Please amend the abstract as follows:

An electronic marker locator with a digital architecture for providing accurate and consistent estimation of the signal strength is presented. The marker locator includes a Digital Phase-Locked Loop (DPLL) structure. The electronic marker locator transmits known and adjustable frequency bursts corresponding to the markers to be located while synchronously capturing the signals returned from the markers. ~~Because of the convergence properties of the DPLL, very consistent measurements of the reflected marker signal field strength are possible, resulting in both an improvement of maximum detection depth and depth accuracy. Further, the analog front-end hardware can be reduced, offering wider resistance to component tolerances, lower calibration and test times, and flexible frequency selectivity.~~